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Lontra felina.

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Lontra felina (Molina, 1782)

Marine Otter

Mustela felina Molina, 1782:284. Type locality "Costa de la provincia de Valparaíso" [Chile].

[*Mustela*] *Lutra chilensis* Kerr, 1792:172. No type locality given [presumably Chile].

Lutra californica Gray, 1837:580. Type locality "California" (in error).

Lutra brachydactyla Wagner, 1841:261. No type locality given.

Lutra peruensis Gervais, 1841:15. No type locality given [presumably Peru].

Lutra peruviensis Gervais, 1841:15. Alternate spelling of *Lutra peruensis* Gervais.

Lutra cinerea Thomas, 1908:393. No type locality given. Not of Illiger, 1815, a member of the genus *Aonyx*.

CONTEXT AND CONTENT. Order Carnivora, Family Mustelidae, Subfamily Lutrinae. The genus *Lontra* includes four species: *L. canadensis, L. felina, L. longicaudis,* and *L. provocax* (Wozencraft, 1993). Generic context and a key to species of the genus may be found in Larivière and Walton (1998). *Lontra felina* is monotypic (van Zyll de Jong, 1972).

DIAGNOSIS. *Lontra felina* (Fig. 1) is the smallest (3.2–5.8 kg) and most distinct species of the genus (van Zyll de Jong, 1972) and the only *Lontra* species to be found exclusively in marine habitats (Ostfeld et al., 1989). The tail is short, the feet are fully webbed, and the ventral surface of the webs is partially haired (Harris, 1968). The rhinarium is bare and has a straight dorsal border, in contrast to the biconcave edge of the southern river otter (*Lontra provocax*), which is larger (>5 kg) and darker (Foster-Turley et al., 1990; Parera, 1996; Redford and Eisenberg, 1992). Giant otters (*Pteronura brasiliensis*) are much larger (>20 kg), and possess dark belly fur and a throat patch that is white to yellow (Eisenberg, 1989; Emmons, 1990).

GENERAL CHARACTERS. The coat is dark on the back and on the sides and slightly paler on the underside, especially on the throat (Sielfeld, 1983; van Zyll de Jong, 1972). Juveniles are slightly darker than adults (Redford and Eisenberg, 1992). Large vibrissae are present above the upper lip and below the corner of the mouth (Sielfeld, 1983).

The skull (Fig. 2) is small and has a basal length of 78–90 mm, never exceeding 100 mm (Sielfeld, 1983). Skull measurements (in mm) of marine otters (van Zyll de Jong, 1972) average (*SD, n*): basal length, 80.0 (6.3, 19); interorbital width, 20.1 (1.6, 19); width of the postorbital process, 25.3 (2.1, 19); width of the postorbital constriction, 18.6 (2.2, 19); rostral width, 21.3 (0.9, 13); mastoid width, 54.1 (4.9, 19); orbitonasal length, 22.0 (2.2, 20); and palatal

FIG. 1. Adult *Lontra felina.* (Photograph courtesy of Antonio Larrea M., Chile).

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of *Lontra felina* (male, Royal Ontario Museum #91299). Greatest length of cranium is 118.0 mm.

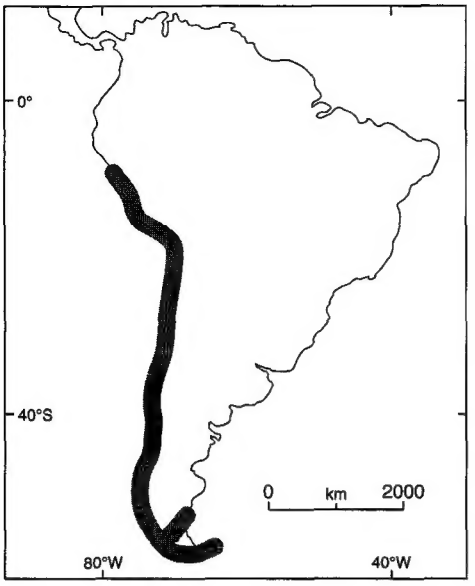

FIG. 3. Distribution of *Lontra felina* in South America (modified from Brack Egg, 1978; Eisenberg, 1989; Redford and Eisenberg, 1992).

length, 40.7 (2.2, 18). The dorsal profile of the skull is straight, and the bullae are short and flat (van Zyll de Jong, 1972). The teeth are relatively large. P1 may be absent, and P4 has a projecting parastyle noticeable in occlusal view. M1 is long and narrow (van Zyll de Jong, 1972). The dental formula is i 3/3, c 1/1, p 3–4/3, m 1/2, total 36 (Redford and Eisenberg, 1992).

DISTRIBUTION. *Lontra felina* is distributed along the Pacific coast from northern Peru (at least to Chimbote, northern limit 6°S latitude) south along the Chilean coast to Cape Horn, Straits of Lemaire and adjacent Islands (Brack Egg, 1978; Brownell, 1978; van Zyll de Jong, 1972—Fig. 3). It is also present in isolated populations in Argentina, especially in the Strait of Magellan and on Staten Island (Cabrera, 1957; Parera, 1996). The original range of *L. felina* has decreased considerably because of excessive hunting (Redford and Eisenberg, 1992), and the species has been nearly exterminated from the regions of Cape Horn and southern Tierra del Fuego (Brownell, 1978). The largest population of marine otters remains in the west coast of Chiloé Island and in southern parts of Chile (Cabello, 1978). Because of its preference for rocky shores, the marine otter is absent from the sandy beaches of the Atlantic Patagonian coasts (Sielfeld, 1989). It is estimated that between 49°S and 53°S, only 10% of the Pacific coast is suitable for *L. felina* (Sielfeld, 1983).

FOSSIL RECORD. The first appearance of otters in South America is uncertain but appears to be in the Pleistocene, either from the Ensenadan (Marshall, 1985; Savage and Russell, 1983), or from the Pampean (van Zyll de Jong, 1972). The genus *Lontra* is also present in Lujanian faunas (late Pleistocene), but specific fossil evidence for *L. felina* is unavailable (Marshall, 1985; Savage and Russell, 1983). The marine otter probably evolved from a stream-dwelling species that adapted to a marine environment after being confined to coastal waters following progressive aridity in the middle latitudes of the South American coast (van Zyll de Jong, 1972). *L. felina* likely is the most recent extant mammal to have evolved a specialized marine niche (Ostfeld et al., 1989).

FORM AND FUNCTION. *Lontra felina* exhibits no sexual dimorphism in size (van Zyll de Jong, 1972). Measurements (mm) of marine otters from Chile (Redford and Eisenberg, 1992) average (*n*, range), for total length, 900 (12, 833–1149); for tail length, 340 (12, 300–362); for hind foot, 95 (9); and for ear length, 15 (*n* unknown). Range of measurements (mm) from marine otters (*n* unknown) from Argentina (Parera, 1996) are, total length, 870–1140; tail length, 300–360; hind foot, 90–100; and ear length, 14–17. Body mass of marine otters varies between 3.2 and 5.8 kg (Osgood, 1943; Parera, 1996; Sielfeld, 1983). Females have four mammae (Sielfeld, 1983).

There is evidence that the dental specialization for crushing may have evolved independently among South American river otters, as *L. provocax* displays a tendency towards broadening of the dentition whereas *L. felina* exhibits the opposite tendency (van Zyll de Jong, 1972). The adaptation of the limbs is not correlated with dental specialization, but instead depends on the degree of aquatic specialization of each species (van Zyll de Jong, 1972).

REPRODUCTION. The marine otter is probably monogamous, but both high abundance of prey and population density may lead to polygamy (Ostfeld et al., 1989). Mating occurs in December or January (Cabello, 1978), and parturition may occur from January to March (Parera, 1996) after a gestation of 60–65 days (Housse, 1953; Sielfeld, 1983). It is unknown whether *L. felina* exhibits delayed implantation. Modal litter size is two, but varies from two to four (Parera, 1996): an adult female collected in February near Peninsula Paracas, Peru, contained one small fetus (crown-rump length, 35 mm) in each horn of the uterus (Brownell, 1978). Annually, only 30–50% of marine otter pairs are observed with young (Medina, 1995*a*). Young remain with the parents for approximately ten months (Cabello, 1983; Sielfeld, 1983).

ECOLOGY. Marine otters inhabit a fringe along the coast including ca. 30 m inland and the nearest 100–150 m of sea (Castilla and Bahamondes, 1979). The species is virtually confined to marine waters, but on occasion marine otters may ascend freshwater rivers (Brownell, 1978; Cabello, 1978; Redford and Eisenberg, 1992). Typically, the areas used by the marine otter are characterized by heavy seas, strong winds, and a high diversity of rock fishes, molluscs, and crustaceans (Cabello, 1978; Ostfeld et al., 1989). Coastlines suitable for marine otters possess rocky outcropppings with caves well above water at high tide and with tunnels leading to water and possibly land, as well as algae communities containing a wide abundance and diversity of prey (Castilla and Bahamondes, 1979). The height of the substrate does not appear to be a selection factor, but the presence of large rocks and crevices or caves is important (Ebensperger and Castilla, 1992). Outcroppings with large rocks contain more caves, harbor more prey, and offer better protection from predators (Ebensperger and Castilla, 1992). Sandy beaches offer marginal habitat (Sielfeld, 1989) and typically are used only for travel between dens and water (Ebensperger and Castilla, 1992). Because not all coastlines are suitable, marine otters are found in disjunct populations throughout their distribution (Redford and Eisenberg, 1992).

Diet of the marine otter has been studied by direct observation of otters capturing prey at sea (Castilla and Bahamondes, 1979; Ostfeld et al., 1989), prey remains in caves and tunnels (Castilla and Bahamondes, 1979), and from analyses of feces (Castilla and Bahamondes, 1979). Fecal analysis alone may not be sufficient because otters often defecate in caves and tunnels which are washed out periodically by high tides (Castilla and Bahamondes, 1979). Furthermore, fecal analysis may underestimate the number of crabs and sea urchins, and overestimate the number of shrimp and fish consumed (Ostfeld et al., 1989; Sielfeld, 1990*a*).

The diet of the marine otter is composed mostly of invertebrates, including crustaceans (decapods, shrimps, and crabs) and molluscs (bivalves and gastropods), and vertebrate prey, including fish from the families Blennidae, Cheilodactylidae, Gobiesocidae, and Pomacentridae, and occasionally birds and small mammals (Cabello, 1978; Castilla and Bahamondes, 1979; Ostfeld et al., 1989; Sielfeld, 1990*a*). Fruits (*Greigia sphacelata, Fascicularia bicolor*) may be consumed on occasion (Brownell, 1978; Cabello, 1978; Medina, 1995*b*). Amphipods, isopods, and pelecypods are rarely (<3% occurrence) consumed (Sielfeld, 1990*a*). Algae and small invertebrates sometimes are present in feces, although this is likely incidental to the consumption of other prey (Cabello, 1978; Ostfeld et al., 1989).

Diet may vary among sites (Ostfeld et al., 1989). In Chile, molluscs are important in Los Molles, shrimp are consumed at Pan de Azúcar, and marine otters in the exposed coast of Chiloé fed on crabs (*Cancer, Homolaspis plana*—Ostfeld et al., 1989).

Lontra felina, although similar to *Enhydra lutris* in diet and habits, occupies a very different ecological niche from it. Indeed, whereas sea urchins (*Strongylocentrotus*) are highly preferred by sea otters, they are rarely taken by marine otters despite the abundance of some species of sea urchins (e.g., *Loxechinus albus*) within marine otter habitats (Ostfeld et al., 1989). Sea urchins are re-

ported as part of the marine otter diet only in southern Chile, where sea urchins occur in only 19% of the feces (n = 105—Sielfeld, 1983, 1990*a*). The diet of the marine otter is not focused on herbivorous molluscs and gastropods (Castilla and Bahamondes, 1979), but instead on carnivorous and omnivorous fish, molluscs, and gastropods from the intertidal or subtidal zone (Castilla and Bahamondes, 1979).

Daily home ranges consist of feeding patches, resting sites, and dens (Castilla and Bahamondes, 1979). Daily home ranges overlap, but individuals may exhibit temporal instead of spatial avoidance. It is unknown whether *L. felina* is territorial (Medina, 1995*a*; Ostfeld et al., 1989).

In areas where it occurs, densities vary from 0.04 to 10 marine otters per km of rocky coastline (Cabello, 1978; Castilla and Bahamondes, 1979; Castilla, 1982; Ebensperger and Castilla, 1991; Medina, 1995*a*; Sielfeld, 1992). Density increases with latitude, and differences may result from variation in social associations, availability of suitable habitats, or illegal harvests (Ebensperger and Castilla, 1991).

Marine otters may compete with gulls (*Larus*), and especially with the South American sea lion (*Otaria flavescens*). The two species are sympatric and consume similar species of fish (Cabello, 1978). The marine otter and the southern river otter (*L. provocax*) have sympatric distributions in southern Chile. Both species show high overlap in their diet (90% for fish species and 80% for molluscs), and in their preference of rocky shores (Sielfeld, 1989). However, marine otters are found in exposed and wavy shores, whereas southern river otters occupy calm bays and inlets (Chehébar, 1990; Ebensperger and Botto-Mahan, 1997; Sielfeld, 1990*b*). The spatial segregation of the two species is likely the result of a spacing strategy to reduce interspecific competition (Ebensperger and Botto-Mahan, 1997; Sielfeld, 1989).

The most important natural predator of the marine otter is the killer whale (*Orcinus orca*—Cabello, 1978), but adults also may be killed by sharks (Parera, 1996). Birds of prey may capture juveniles when on land (Cabello, 1983). Besides being hunted for their skins, marine otters may be killed incidentally during fishing operations (Brownell, 1978).

Parasites include nematodes and acanthocephalans, which sometimes occur in high densities (Cabello, 1978). Nothing is known about diseases in this species (Brownell, 1978).

Habitat destruction, pollution, and poaching are the major threats to marine otters in South America (Castilla and Bahamondes, 1979; Chehébar, 1990; Estes, 1986; Iriarte and Jaksic, 1986). Occasionally, marine otters may be killed or persecuted for alleged damage to local fish, bivalves, and shrimp populations (Miller et al., 1983; Redford and Eisenberg, 1992). Illegal commerce in marine otter pelts is still relatively frequent in southern Chile (Macdonald and Mason, 1990). The pelt of a marine otter may be worth 2–3 months' wage for an unskilled Chilean worker, and the potential for being caught and fined is low (Miller et al., 1983). Marine otters are harvested illegally with shotguns, nets, or with the aid of dogs (Medina, 1996), and in southern Chile, pelts are used for footwear, especially boots (Castilla, 1981). In Chile, excessive hunting and habitat alteration, especially human settlements, are responsible for the extermination of *L. felina* from the northern fringe of its former range (Chehébar, 1990).

Marine otters are sometimes domesticated and used by fisherman. Juveniles otters readily accept bottle-feeding, and adults adapt easily to freshwater ponds and food items provided to other domestic animals (Castilla, 1981, 1982). Play behavior may occur between marine otters and other domestic animals (Castilla, 1981, 1982).

BEHAVIOR. The marine otter is mostly solitary, and seldom found in groups of more than three individuals (Cabello, 1978; Castilla, 1981; Housse, 1953). In Pan de Azùcar Island, Chile, 73.6% of 209 observations of marine otters were of single animals, 18.7% were of pairs, 7.1% of trios, and in only one instance (0.6%), a group of four individuals (Ebensperger and Castilla, 1991). Adults may compete aggressively for captured prey (Ostfeld et al., 1989) or resting sites (Medina, 1995*a*). Marine otters display scent marking behavior using feces and secretions from their anal glands (Medina, 1995*a*; Parera, 1996).

Copulation lasts on average 8.5 min (Parera, 1996) but may extend to 40 min (Cabello, 1978). Parturition occurs in a den or on shore between rocks and the coastal vegetation (Cabello, 1978). Marine otters move their young between caves by carrying them in their mouth or by swimming on their back and resting the young on their belly (Castilla and Bahamondes, 1979). Both adults in a pair bring prey back to the den (Ostfeld et al., 1989).

Play behavior of the marine otter has been reported, but with few details (Castilla and Bahamondes, 1979; Ebensperger and Castilla, 1992). Marine otters are difficult to study because they spend considerable time underwater or in caves and tunnels and because of their wary nature towards humans (Castilla and Bahamondes, 1979).

Lontra felina is more agile in water than on land (Cabello, 1978) but is an agile and fast rock climber. When moving in water, only the head and upper portion of the back is exposed above water, the body remaining submerged. Marine otters may dive to depths of 30–40 m (Castilla and Bahamondes, 1979) and move 50 m underwater (Cabello, 1978). Occasionally, the animal floats on its back, maintaining its position with its tail, enabling ingestion of food even in high waves (Cabello, 1978). On land, otters may use rocky outcroppings for feeding, grooming, resting, sunning, and playing (Castilla and Bahamondes, 1979), and occasionally to give birth (Cabello, 1978) or nurse (Ebensperger and Castilla, 1992). There is no correlation between time spent on land and tidal movement. Marine otters occasionally emerge from the water to rest and observe the surroundings for 5–18 s, vertically, with only the head exposed above water (Castilla and Bahamondes, 1979).

Activity of marine otters is primarily diurnal (Ostfeld et al., 1989), although the extent of nocturnal activity is unknown (Cabello, 1978; Castilla and Bahamondes, 1979). Activity patterns vary among sites, and marine otters may display peaks of activity in early morning, mid-afternoon, or evenings (Ostfeld et al., 1989). Variation in activity peaks may be related to the type of prey hunted: crabs are likely available all day, resulting in undefined peaks, whereas fish may be more easily obtained during mornings and evenings (Ostfeld et al., 1989). Pairs of marine otters with young and pairs without young have similar activity budgets, spending >50% of time resting, and 18–40% feeding (Medina, 1995*a*). However, pairs with young spend more time feeding during the evening than pairs without cubs. Pairs without cubs spend more time feeding offshore than pairs with cubs (Medina, 1995*a*). Between November and January, cubs spend most of their time inside the den or learning to hunt and interact with other juveniles (Medina, 1995*a*). During this period, adults will carry food back to the natal den for the young (Medina, 1995*b*).

Marine otters usually start feeding by swimming to an area <100 m offshore and begin diving when close to rocks with abundant brown algae (*Durvillea antarctica* and *Lessonia nigrescens*—Medina, 1995*b*). Marine otters do not appear to see prey or suitable hiding sites for prey from the surface, and they start searching only when arriving at the bottom. Thus, dive length is correlated more with water depth than with prey availability (Medina, 1995*b*). Hunting dives last from 6–64 s (Castilla and Bahamondes, 1979; Ostfeld et al., 1989) and may average 28.5 s (SD = 8.6, n = 1,569—Ostfeld et al., 1989) or 33.3 s (SD = 12.2, n = 190—Medina, 1995*b*). Marine otters obtain prey during 26–32% of the dives (Medina, 1995*b*; Ostfeld et al., 1989). There is no association between dive length and success (Medina, 1995*b*; Ostfeld et al., 1989), or between dive length and prey size (Medina, 1995*b*; Ostfeld et al., 1989). Marine otters will move to another area after several unsuccessful dives or after catching a medium or large prey: marine otters spend 63–70% of their time feeding on small and medium-sized prey, and fish captured may reach the length of an adult marine otter (Medina, 1995*b*). Adult marine otters may cooperate in searching for prey (Ostfeld et al., 1989), although this is rare (Medina, 1995*b*).

Small prey are consumed almost exclusively in water (Ostfeld et al., 1989), but medium and large prey are consumed on offshore rocks, on the coast, or in a den (Medina, 1995*b*; Ostfeld et al., 1989). Captured prey may be carried in the mouth by otters swimming ventrally or by those swimming dorsally with prey on their belly. Pairs with cubs brought and consumed 12.5% of prey in the den, 8.2% on offshore rocks, and 79.3% at the water surface, whereas pairs without cubs consumed all prey captured in the water (Medina, 1995*b*). Crabs are brought to shore, turned on their backs and held with the forepaws. The underside of the crab is then separated from the carapace and the underparts are eaten, but the legs are frequently left unconsumed (Medina, 1995*b*). Unlike sea otters (*E. lutris*), marine otters have not been observed using tools

such as rocks to break open shells or exoskeleton of prey (Castilla and Bahamondes, 1979).

Interactions between pairs may be amicable, but fighting over captured prey may be aggressive and involve active fighting and biting (Ostfeld et al., 1989). Bleeding wounds and high-pitched squeaking vocalizations may occur during fighting (Ostfeld et al., 1989).

The marine otter makes extensive use of caves, cavities, and tunnels along the coast. Caves are used for parturition, rest, feeding, and deposition of feces (Castilla and Bahamondes, 1979). Dens are primarily found on shores with boulders and unfractured rocks (Sielfeld, 1990*b*). In southern Chile, 96.7% of dens (n = 60) were found in association with an intertidal belt of *Lessonia nigrescens* and *Durvillea antarctica*. The latter (*D. antarctica*) usually is associated with heavy exposure to oceanic waves (Sielfeld, 1990*b*).

Cave entrances may be totally or partially exposed at high tide and may have terrestrial entrances (Cabello, 1978; Castilla and Bahamondes, 1979). Seven caves examined in Chile were located 8–30 m from the water line at low tide and were 2–25 m above sea level at low tide (Castilla and Bahamondes, 1979). Five of six dens observed by Ostfeld et al. (1989) occurred in spaces between boulders, whereas one was in a narrow vertical crevice in a cliff rising from the sublittoral zone to ca. 6 m above sea level. Dens were 2–3 m above mean high tide, and 4 of 6 dens had underwater entrances (Ostfeld et al., 1989). Entrances of dens in southern Chile were all above water: distance and elevation from the water line averaged 7.6 m (SD = 5.8, n = 17) and 3.9 m (SD = 3.9, n = 14), respectively (Sielfeld, 1990*b*). Pairs with cubs prefer dens in natural caves under steep rocks with difficult access from land, and with proximity to offshore rocks and feeding patches in shallow water protected from waves (Medina, 1995*a*). Density of dens along the southern part of the Chilean coast averages 2.2–3.0 dens per km of coastline (Sielfeld, 1992).

Marine otters often deposit feces in the tunnels and caves of their dens. The sanitary state of the dens is maintained daily by washing from the high tides, or seasonally from the high spring tides (Castilla and Bahamondes, 1979). Marine otters also use large rocks for excretion (Ebensperger and Castilla, 1992). Fresh droppings (n = 16) weigh an average of 131 g (Castilla and Bahamondes, 1979).

GENETICS. *Lontra felina* has 2n = 38 chromosomes (van Zyll de Jong, 1987).

CONSERVATION STATUS. *Lontra felina* is classified as vulnerable by the International Union for the Conservation of Nature (IUCN), endangered by the United States Department of Interior (USDI), and is listed in Appendix 1 of the International Convention on the Trade of Endangered Species (Nowak, 1991). The remaining population of *Lontra felina* probably consists of <1,000 individuals (Nowak, 1991). The Peruvian coast may host only 200–300 marine otters (Castilla and Bahamondes, 1979). In Argentina, *L. felina* is on the verge of extinction and may persist only on the eastern coast of Tierra del Fuego and on Staten Island (Chehébar, 1990; Parera, 1996). The marine otter is now protected in Argentina, Chile, and Peru (Chehébar, 1990).

REMARKS. Limited information is available on *Lontra felina*, and studies detailing its ecology, morphology, natural history, and behavior are much needed (Chehébar, 1990; Estes, 1986). A current survey of its distribution and abundance is also required to reevaluate the status of this species (Mason and Macdonald, 1990).

The generic name *Lontra* was derived from the Italian name for the otter "Lontre." The specific name *felina* was derived from the Latin *felineus* meaning of or belonging to a cat (Jaeger, 1978).

Other vernacular names for the marine otter include sea cat (Chanin, 1985), South American sea otter (Castilla and Bahamondes, 1979), and Chilean sea otter (Castilla, 1982). Spanish names include chinchimén, chingungo, chungungo, gato marino, gato de mar, gatuna, huallaque, lobito marino, and nutria de mar (Brack Egg, 1978; Brownell, 1978; Castilla and Bahamondes, 1979; Redford and Eisenberg, 1992). Other names include loutre féline and loutre marine (French) and lontra felina (Italian—Foster-Turley et al., 1990).

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